PART — II

4th Semester

FINAL DRAFT FOR CURRICULAR STRUCTURE AND SYLLABI OF FULL-TIME DIPLOMA COURSES IN ELECTRICAL & ELECTRONICS ENGINEERING & TECHNOLOGY

Further suggestion may be submitted to the syllabus committee. List of the coordinators for the branch of Diploma in Electrical & Electronics Engineering are:

- **Sri Ashim Kumar Manna Mobile:8902701784**
- **Sri Swarup Kar Mobile:9433689007**
- **Sri Pinaki Ranjan Paul Mobile:9433130215**
- **Sri Anup Sarkar Mobile:9433521132**
- **Sri Swarup Kayal Mobile:9433164470**

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION

TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES

COURSE NAME: FULL TIME DIPLOMA IN ELECTRICAL & ELECTRONICS ENGINEERING

DURATION OF COURSE: 6 SEMESTERS

SEMESTER: FOURTH

BRANCH: ELECTRICAL & ELECTRONICS ENGINEERING

SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME						
			L	TU	PR	INTERNAL SCHEME			ESE	PR	@TW	Total Marks
						TA	CT	Total				
1.	**Electrical Machines-II**	3	3	-	.-	10	20	30	70	-	-	100
2.	**Analog Electronics –II**	3	3	-	-	10	20	30	70	-	-	100
3.	**Consumer Electronics**	3	3	-	-	10	20	30	70	-	-	100
4.	**Digital Electronics**	3	3	-	-	10	20	30	70	-	-	100
5.	**Power Plant Engineering**	3	3			10	20	30	70			100
6.	**Analog & Digital Communication**	3	3			10	20	30	70			100
7.	**Electrical Machines-II Laboratory**	1	-	-	2	-	-	-	-	50	-	50
8.	**Analog Electronics-II Laboratory**	1	-	-	2	-	-	-	-	50	-	50
9.	**Consumer Electronics Laboratory**	1	-	-	2	-	-	-	-	50	-	50
10.	**Digital Electronics Lab**	1	-	-	2	-	-	-	-	50	-	50
11.	**Analog & Digital Communication Lab**	1			2					50		50
12.	**Development of Life Skill-II Laboratory**	2	1	-	2	-	-		-	50	-	50
13.	**Professional Practice – II**	1	-	-	2	-	-	-	-	-	50	50
	Total	26	19	-	14	60	120	180	420	300	50	950

STUDENT CONTACT HOURS PER WEEK:33 hrs, (Teaching-15 weeks + Internal Exam-2 weeks)

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH

ABBREVIATIONS: L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam

TA: Attendance & surprise quizzes = 6 marks, Assignment & group discussion = 4 marks.

Total Marks : 950

Minimum passing for Sessional marks is 40%, and for theory subject 40%.

Assessment of Practical, Oral & term work to be done as per the prevailing norms of curriculum implementation & assessment.

.

Name of the course: **Electrical Machine – II**	
Course Code: EEE/EM/S4	Semester: Fourth
Duration: One Semester (Teaching - 15 weeks + Internal Exam-2 weeks)	Maximum Marks: 100 Marks
Teaching Scheme:	**Examination Scheme**
Theory: 3 contact hrs./ week	Class Test (Internal Examination): 20 Marks
Tutorial:	Teacher's Assessment (Attendance, Assignment & interaction): 10 Marks
Practical:3 contact hours/ week	End Semester Examination: 70 Marks
Credit: 3 (Theory)+ 1(Practical)	Practical: 50 Marks
Rationale:	

Sl. No.	
1.	Students will be able to analyze the performance of 3-phase and single phase A.C motors and 3-phase Alternators both qualitatively and quantitatively.
2.	These machines are used widely in various Industries and Power plants. So knowledge gained by the students will be helpful in their job in industry and power plants.

Objectives:

Student will be able to:

- Interpret the constructional details & working principles of A.C motors & generators.
- Test A.C motors & generators.
- Evaluate the performance of A.C machines by conducting different tests.
- Decide the suitability of AC machines for particular purpose.
- Write specifications of A.C motor & generators as required.
- Operate AC motor & generators as per requirement.

Pre-Requisite:

- Three phase & single phase A.C fundamentals, Electromagnetism.
- Basic electronics engineering.

Content (Name of topic)		Periods	Marks
Group-A			
Unit 1	**Three-Phase Induction Motor:**	13	24
	1.1 Construction of 3-phase induction motor. 1.2 Production of rotating magnetic field. 1.3 Working principle of 3-phase induction motor. 1.4 Concept of Synchronous Speed & Slip. 1.5 Equation of rotor induced emf, current, frequency, reactance & impedance under standstill and running condition. **(Numerical)** 1.6 Vector diagram (at no-load & running condition). 1.7 Concept of Equivalent circuit (at no-load, at blocked rotor and at running condition).**(No Numerical)** 1.8 Derivation of Torque equation, Starting torque, Running torque,		

	Maximum torque and condition for maximum torque. **(Numerical)** 1.9 Torque- Slip characteristics, Effect of change in rotor circuit resistance and supply voltage on Torque-Slip characteristics. 1.10 Power stages in 3-phase induction motor and their relation, Losses, Efficiency. **(Numerical)** 1.11 Starting methods of 3-phase induction motor by– a) Rotor resistance starter. b) Direct -On-Line starter. c) Autotransformer starter. d) Star-Delta starter (Manual & Automatic).**(Numerical for all starter)** 1.12 Speed control of 3-phase induction motor by – a) Changing supply frequency. b) Pole changing method. c) Changing Rotor circuit resistance & stator reactance. d) Changing supply voltage. 1.13 Braking of 3-phase induction motor by – a) Plugging. b) Rheostatic method. c) Regenerative method. 1.14 Cogging & Crawling (simple idea) 1.15 Concept of Double cage rotor & Deep-bar rotor. 1.16 Motor enclosures and specification as per I.S Code. 1.17 Industrial applications of 3-phase induction motor.		
Unit 2	**Alternator:**	13	24
	2.1 Construction of 3-phase alternator, Description of salient & non-salient rotor. 2.2 Methods of excitation systems of 3-phase alternator by – a) Static excitation. b) Brushless excitation. c) DC generator. 2.3 Advantages of Stationary armature and Rotating field system. 2.4 Armature winding – Single layer and multilayer, Concentrated and Distributed (Concept only). 2.5 Derivation of E.M.F. equation of 3-phase alternator, Effect of Coil span factor and Distribution factor on emf, Winding factor. **(Numerical)** 2.6 Factors affecting the terminal voltage of alternator – a) Armature resistive drop b) Leakage reactance drop. c) Armature reaction at various p.f, concept of Synchronous reactance. 2.7 Phasor diagrams of cylindrical rotor alternator at lagging, leading & unity p.f. loads.		

	2.8 Voltage regulation of 3-phase alternator by – **(Numerical)** a) Synchronous Impedance Method. 2.9 Open circuit characteristics, Short circuit characteristics of alternator and determination of synchronous reactance. 2.10 Active & Reactive power equations in terms of load angle at steady state for non-salient pole alternator. 2.11 Steady-state characteristics of Alternator – a) Terminal voltage vs. Load current, at different p.f, b) Field current vs. Load current at different p.f, c) Active & Reactive Power vs. load angle (non-salient alternator). 2.12 Short circuit ratio (SCR) – concept & significance. 2.13 Method of control of Active & Reactive Power of an alternator. 2.14 Reasons & advantages of Parallel operation. 2.15 Synchronization of two or more alternators by - a) Three lamps method. b) Synchroscope. 2.16 Parallel operation of (i) an alternator & infinite bus and (ii) Between two alternators & Load sharing between them.**(Numerical)**		
Unit 3	**Synchronous Motor:**	08	08
	3.1 Construction and working principle. 3.2 Methods of starting by – a) An auxiliary motor. b) Damper winding. 3.3 Effect of variation of Load – Speed vs. Torque characteristics. 3.4 Effect of variation of excitation at infinite bus (over and under excitation) – V curves & inverted V-curves. 3.5 Hunting, George's phenomenon. 3.6 Applications of synchronous motor, Synchronous condenser.		
Unit 4	**Single phase motors:**	5	8
	4.1 Double-revolving field theory. 4.2 Construction, Principle of operation and Applications of different types of single-ph Induction motors – a) Split phase (resistance) type. b) Capacitor start type. c) Capacitor run type. d) Shaded pole motors.		
Unit 5	**Special Machines:**	6	6
	5.1 Linear induction motor. 5.2 Induction generator. 5.3 A.C series motor. 5.4 Reluctance Motor.		
	TOTAL	45	70

Practical:	
Skills to be developed:	
Intellectual skills:	
1. Analytical skills.	
2. Identification skills.	
Motor skills:	
1. Measurement (of parameters) skills.	
2. Connection (of machine terminals) skills.	
Sl. No.	**List of Practical: (At least Five Experiments are to be performed)**
1.	a) To measure the slip of 3-phase induction motor by – (i) Stroboscopic method, (ii) Tachometer. b) To reverse the direction of rotation of 3-phase induction motor.
2.	To perform No-load test and Blocked-rotor test on 3-phase induction motor & draw the equivalent circuit from the two tests.
3.	To perform the load test on 3-phase induction motor and to study the performance characteristics of the motor.
4.	To control the speed of 3-phase Induction motor by– (i) Frequency changing method, (ii) Pole-changing method.
5.	To start a 3-phase Slip-ring induction motor by rotor resistance starter and determine the effect of the rotor resistance on the torque-speed curves of an induction motor.
6.	To observe the effect of excitation and speed on induced e.m.f of a 3-phase alternator and plot the O.C.C. of the alternator.
7.	To find the percentage regulation of 3-phase alternator by synchronous impedance method at various power factor and load.
8.	To synchronise two 3-phase alternator for parallel operation by **-** a) Three lamp method, b) Synchroscope & to study the sharing of load between the alternators.
9.	To list and explain various starting methods of 3-phase synchronous motor and applying any one of them to start the synchronous motor. Plot V-curve & inverted V-curve of the same motor.
10.	To study the effect of capacitor on the starting and running condition of a single-phase Induction motor, and to determine the method of reversing the direction of rotation.

EXAMINATION SCHEME (THEORITICAL)

GROUP	UNIT	ONE OR TWO SENTENCE ANSWER QUESTIONS				SUBJECTIVE QUESTIONS			
		TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	***TO BE ANSWERED***	MARKS PER QUESTION	TOTAL MARKS
A	1, 4,5	12				FIVE	FIVE, TAKING		

B	2,3,6	11	TWENTY	ONE	1 X 20 = 20	FOU R	AT LEAST TWO FROM EACH GROUP	TEN	10 X 5 = 50

Note: Paper-setter should take into account the marks which have been allotted in each unit and set the paper accordingly so that all units get the importance as allotted.

EXAMINATION SCHEME (SESSIONAL)

1. **Continuous Internal Assessment of 25 marks** is to be carried out by the teachers throughout the Fourth Semester. **Distribution of marks: Performance of Job – 15, Notebook (Drawing) – 10.**
2. **External Assessment of 25 marks** shall be held at the end of the Fourth Semester on the entire syllabus. One Experiment per student from any one of the above is to be performed. Experiment is to be set by lottery system. **Distribution of marks: On spot job – 20, Viva-voce – 5.**

Name of the course: **Analog Electronics-II**			
Course Code: EEE/AE1I/S4	Semester: Fourth		
Duration: One Semester (Teaching - 15 weeks + Internal Exam-2 weeks)	Maximum Marks: 100 Marks		
Teaching Scheme:	**Examination Scheme**		
Theory: 3 contact hrs./ week	Class Test (Internal Examination): 20 Marks		
Tutorial:	Teacher's Assessment (Attendance, Assignment & interaction): 10 Marks		
Practical: 2 contact hours/ week	End Semester Examination: 70 Marks		
Credit: 3 (Theory)+ 1(Practical)	Practical: 50 Marks		
Rationale:			
The physical world is inherently analog.			
Objectives:			
The student will be able to 1. describe an operational amplifier, 2. explain how its operation in a circuit depends on certain parameters, 3. recognize various op-amp circuit and its applications, 4. be familiar with microelectronic technology, 5. observe, measure and record various types of waveforms through the use of applicable measuring instruments and perform essential tests, diagnosis & repairs.			
Content (Name of topic)		**Periods**	**Marks**

Group-A			
Unit 1	**Tuned Amplifier**		
	1.1 Circuit operation of single tuned, double tuned and stagger tuned amplifiers	3	
Unit 2	**Feedback Amplifier**	6	
	2.1 Basic idea of positive and negative feedback – Effect of negative feedback on gain, gain stability, distortion, noise, bandwidth, phase shift, input and output impedances 2.2 Voltage and current, series and shunt feedback 2.3 Performance of emitter follower circuit – Calculation of gain and input & output impedances – Darlington pair		
Unit 3	**Operational Amplifier**	12	
	3.1 Circuit operation of differential amplifier – single & double ended 3.2 INTRODUCTION TO OPERATIONAL AMPLIFIER**:** Inverting and non-inverting mode and their gain calculation – Common mode rejection ratio – Bias current – Offset voltage and current – Slew rate – Open loop and closed loop gain – Input and output impedance – Frequency response and virtual ground 3.3 APPLICATIONS OF OPAMP**:** Adder – Subtractor – Voltage Follower – Integrator – Differentiator – Comparator – Schmitt Trigger – Voltage Limiter – Log Amplifier – Clipper – Clamper 3.4 Concept of Active Filter		
	Group B		
Unit 4	**Oscillator**	6	
	4.1 Concept of oscillation – Barkhausen criteria 4.2 Operation of following oscillators**:** — a) tuned collector, b) Hartley, c) Colpitt, d) Wein-bridge, e) Phase Shift, and, f) Crystal.		
Unit 5	**Relaxation Oscillator**	4	
	5.1 Operation of monostable, astable and bistable multivibrator with waveforms 5.2 Schmitt trigger circuits 5.3 IC-555, internal block diagram and pin function, construction of different multivibrators with IC-555		
	Group-C		
Unit 6	**Sweep Circuits**	4	
	6.1 Fundamentals of sweep circuit operation – Difference between voltage time base generator and current time base generator 6.2 Operation of Miller and Bootstrap circuits – Applications of Sweep Circuits.		
Unit 7	**Microelectronics Technology**	10	
	7.1 Advantages of ICs over discrete elements 7.2 TYPES OF ICS**:** Linear and Digital – Monolithic and Hybrid 7.3 PLANAR TECHNOLOGY**:** Crystal growth of wafer – Epitaxial growth – Oxidation – Photolithography – Chemical etching – Diffusion – Ion implantation and metallisation (ideas only) 7.4 Fabrication of BJT, diode, resistor and capacitor (salient features), Fabrication		

	of NMOS, PMOS & CMOS		
	TOTAL	45	

Contents Practical

Skills to be developed: On satisfactory completion of the course, the students should be in a position to design few fundamental networks.

Intellectual Skills:

1. Interpret the results
2. Verify the tables

List of Practical: Any EIGHT

Suggested List of Laboratory Experiments

Sl. No.	
1.	To determine the frequency response characteristics of a tuned amplifier.
2.	To determine the frequency characteristics of a negative feedback amplifier and compare with that of an amplifier without feedback.
3.	To study the waveforms and measure the frequency of **:** — a) Wien bridge, b) Hartley, c) Colpitt, d) tuned collector, e) RC phase shift, and, f) crystal oscillator circuit.
4.	To study the waveform of UJT as relaxation oscillator.
5.	To study the characteristics of IC555 timer connected as**:** a) astable multivibrator, b) monostable multivibrator.
6.	To observe the waveform at the input and output of clipping circuits in different clipping configuration.
7.	To study the operation of positive and negative clamper circuit.
8.	To study the characteristic parameters of differential amplifier in single ended and double ended versions**:** — a) input impedance, b) common mode voltage gain, c) differential mode voltage gain, d) CMRR.
9.	To determine the following characteristics of op-amp**: —** a) input offset voltage, b) slew rate, c) non-inverting gain, d) inverting gain.
10.	To study the following applications of op-amp using IC741**:** — a) adder, b) subtractor, c) differentiator, d) integrator, and, e) voltage follower

Examination scheme (Theoretical):

A). Internal Examination: Marks- 20

B). End Semester Examination: Marks-70

C) Teacher's **Assessment: Marks- 10**

(i) Marks on Attendance: Marks-05

(ii)Assignments & Interaction: Marks- 05

Group	**Unit**	**Objective questions** **Note: 10 multiple choice and 5 short answer type questions**			**Total Marks**
		To be set Multiple Choice (Twelve questions)	To be answered	Marks per question	
A	1,2,3	4	Any ten	1	10 X 1 = 10
B	4,5	4			
C	6,7	4			

		To be set short answer type (Ten questions)	To be answered	Marks per question	
A	1,2,3	3	Any five	2	5x2=10
B	4,5	3			
C	6,7	4			

Group	Unit	Subjective Questions			Total Marks
		To be set (Ten questions)	To be answered	Marks per question	
A	1,2,3	3	Any five (Taking at least one from each group)	10	10 X 5 = 50
B	4,5	3			
C	6,7	4			

E X A M I N A T I O N S C H E M E (SESSIONAL)

Name of Subject: Analog Electronics-II Laboratory **Full Marks-50**

Subject Code: ETCE/ LAEII/ S4

1. Continuous Internal Assessment of 25 marks is to be carried out by the teachers throughout the 4th Semester. **Distribution of marks: Performance of Job – 15, Notebook – 10.**

2. External Assessment of 50 marks shall be held at the end of the 4th Semester on the entire syllabus. One experiment per student from any one of the above is to be performed. Experiment is to be set by lottery system. **Distribution of marks: On spot job – 35, Viva-voce – 15.**

Note 1 : Teacher's assessment will be based on performance on given assignments & quizzes.

Note 2 : Assignments may be given on all the topics covered on the syllabus.

Sl. No.	Name of the Author	Title of the Book	Name of the Publisher
1.	Boylestad & Nashalsky	Electronic Devices and Circuits	Pearsons Eduction
2.	David A. Bell	Electronic Devices and Circuits	Oxford University Press
3.	Anil K. Maini	Electronics Devices and circuits	Wiley
4.	Chattopadhyay & Rakhshit	Basic Electronic & Linear Circuits	New Age International
5.	Ramesh Babu	Electronic Devices & Circuits	**Scitech**
6.	Shredhra Smith	Microelectronics	Oxford University Press
7.	Sanjay Sharma	Electronics Devices and circuits	S K Kataria and sons
8.	J B Gupta	Electronics Devices and circuits	S K Kataria and sons
9.	S. Salivanan	Electronic Devices and Circuits	Tata McGraw-Hill
10.	Malvino	Electronic Principles	Tata McGraw-Hill
11.	Milman & Halkias	Integrated Electronics	Tata McGraw-Hill
12.	Gayakwad	OP Amp and Linear Integrated Circuits	Prentice Hall of India, N. Delhi
13.	Ganesh Babu	Linear Integrated Circuits	SCITECH

14.	Mottershed	Electronic Devices and Circuits	Prentice Hall of India, N. Delhi
15.	Bhargava	Basic Electronic & Linear Circuits	Tata McGraw-Hill
16.	Sahadeb	Electronic Principle	Dhanpat Rai & Sons
17.	Rashid	Microelectronics	Wiley
18.	M.L. Anand	Electronics Devices and Circuits	S.K. Kataria and sons
19.	Dr. T. Thygrajan	Basic Electronics	SCITECH
20.	Subhadeep Chowdhury	Fundamentals of Electronics	Paragon Publisher
21.	Premsingh Jakhar	Basic Electronics	Dhanpat Rai Publishing Co
22.	Maitreyi Ray Kanjilal	Analog Electronics Circuits	JBBL

Name of the course: **Consumer Electronics**	
Course Code: EEE/ CONSUMER/ S4	Semester: Fourth
Duration: One Semester (Teaching - 15 weeks + Internal Exam-2 weeks)	Maximum Marks: 100 Marks
Teaching Scheme:	**Examination Scheme**
Theory: 3 contact hrs./ week	Class Test (Internal Examination): 20 Marks
Tutorial:	Teacher's Assessment (Attendance, Assignment & interaction): 10 Marks
Practical: 2 contact hours/ week	End Semester Examination: 70 Marks
Credit: 3 (Theory)+ 1(Practical)	Practical: 50 Marks
Rationale:	

This course is designed to provide required knowledge and skills in the communication systems such as microphone and loudspeakers. Revolution in electronics technology has brought radical changes in Audio & Video system in the recent years and the state of art will enable the students to comprehend, the fact, concept, working principle and its application. The knowledge so gathered by the students will help them to be familiar with designing concepts and repairing of audio & video system.

The low cost video system VCR, cameras have brought about video revolution in the field of home entertainment, education, training, advertising and electronic newsgathering. Dramatic developments in flat panel display, reduction in the cost of image scanning system, LCD display and integrated subsystems is going to affect our communication capabilities and life-style in a big way.

Objectives:

The student will be able to:

- Understand the basic concept dealing with the operations of microphone, loudspeakers and Stereo phonic system;
- Understand the basic concepts dealing with the operation of B/W TV circuits, Colour TV circuits, CD player mechanism & fault finding in CD player with advance technique MP3 player & DVD unit.
- This will also touch the advance topic of the plasma LCD Television system & flat panel display.
- Learn the comparison of NTSC, PAL, and SECAM system.
- Understand the principle of DTH, and HDTV.

• Discuss the principle of CCD & remote control.			
Content (Name of topic)		**Periods**	**Marks**
Group-A			
Unit 1	**Microphone**	5	
	1.1 Discuss the characteristics of Microphones (Sensitivity, Frequency Response, Output Impedance, Distortion, Directivity) 1.2 Discuss the Principle of operation, construction, of Advantages and disadvantages of Carbon Microphone — Capacitance Microphone — Moving Coil Microphone - Wireless Microphone.		
Unit 2	**Loud Speaker**	6	
	2.1 Constructions and working principles of Moving Coil Loudspeaker – Impedance and Power Level of loudspeaker 2.2 Frequency response of Practical Loudspeakers**:** Woofer, Tweeter, Squawker – Loudspeaker Enclosure		
Unit 3	**Stereos**	5	
	3.1 Explain the concept of monophonic & stereo phonic sound system. 3.2 DETAILS OF STEREO COMPONENTS**:** Tone control, Bass, Treble, Balance & Control – Crossover Networks – Graphic Equalizer – Noise Reduction Techniques		
Unit 4	**Advanced Sound Systems**	6	
	4.1 Basic principles of Magnetic Recording, Playback. 4.2 Basic principles of digital recording & block diagram of MP3 player & Explanation.		
Group-B			
Unit 5	**Black and White TV System**	10	
	5.1.State and explain the following terms. 5.1.1 Aspect ratio. 5.1.2 Flicker. 5.1.3 Resolution. 5.1.4 Video bandwidth. 5.1.5 Interlaced scanning. 5.1.6 Composite video signal, discuss horizontal & vertical sync. 5.2 Working principle with block diagram of TV transmitter and receiver 5.3 Brief description with circuit diagram: TV Tuner – Video IF stage – Sound stage – Picture tube & its associated circuit – Synchronizing circuits – Automatic Gain Control (AGC) – Horizontal & vertical deflection circuits – EHT section – Remote control of a TV receiver **5.4** Television broadcast standards, Describe principle of operation of CCD cameras.		
Unit 6	**Colour TV System**	12	
	6.1 Fundamental concepts of RGB colour systems and RGB drivers of a colour picture tube, Distinguish between additive and subtractive mixing of		

	colours. 6.2 Explain complementary colours, hue, saturation, and Colour circle. 6.3 Explain compatibility in TV system. 6.4 Different colour systems like NTSC, SECAM and PAL system and their comparison 6.5 Working principle of Vidicon camera, Block schematic description of a colour TV Transmitter and Receiver, explain working principle of PAL encoder and decoder, discuss Colour picture tube & its associated circuits. 6.6 Discuss the colour TV signals (Luminance Signal & Chrominance Signal,(I & Q, U & V Signals), bandwidth of Chrominance Signal, colour subcarrier frequency & colour brust. 6.7 Discuss the principle of operation of Shadow mask and Trinitron picture tube. 6.8 Explain the De-gaussing circuit in Colour TV receiver 6.9 Basic concept on Flat panel Display, Plasma Display, LCD display, LED display		
	Group- C		
Unit 7	**CD Player**	3	
	7.1 Working principle of CD recording and CD playing – Explain 7.2 Block diagram and working principle of VCD and DVD Player		
Unit 8	**Principle of Cable, Satellite and HDTV System**	7	
	6.1 Modern cable TV system block diagram - Head end processor - Trunk & cable distribution system with block diagram – scrambling – descrambling 6.2 State the need for satellite for TV broadcasting over wide area. 6.3 Concepts of HDTV system, List HDTV standards. 6.4 Explain TV Remote control transmitter and Receiver with block diagram. 6.5 Direct to Home System (DTH) Introduction & Block Diagram. Concept of set top box 6.6 Block diagram of dB meter with working principle.		
	TOTAL	60	

Contents Practical

Skills to be developed: On satisfactory completion of the course, the students should be in a position to design few fundamental networks.

Intellectual Skills:

1. Reading
2. Sourcing of Websites

Motor Skill:

1. Testing
2. Measurement
3. Detection of faults and remedial measures

List of Practical: Any EIGHT(including MINI PROJECT)

Suggested List of Laboratory Experiments

Sl. No.	
1.	To study the internal layout of black and white TV receiver.
2.	To study the Internal adjustment, control and fault finding procedure of Black & White TV.
3.	To study the internal layout of colour television
4.	To study the internal adjustments control and simple troubleshooting techniques of Colour TV.
5.	Fault finding in given Colour TV : i) No color ii) Red Colour only iii) Blue color only iv) Green color only. v) Magenta color only vi) Cyan only vii) Yellow only viii)No raster, No Sound.
6.	Fault finding in given Colour TV : i) In HSYNC section ii) In VSYNC section iii) In SYNC separator
7.	Installation of DTH System
8.	Estimate the cost, layout of Cable TV.
9.	Collect information about Set Top box used for Cable TV at home

Examination scheme (Theoretical):

A). Internal Examination: Marks- 20

B). End Semester Examination: Marks-70

C) **Teacher's Assessment: Marks- 10**

(i) Marks on Attendance: Marks-05

(ii) Assignments & Interaction: Marks- 05

Group	**Unit**	**Objective questions** **Note: 10 multiple choice and 5 short answer type questions**			**Total Marks**
		To be set Multiple Choice (Twelve questions)	To be answered	Marks per question	
A	1,2,3,4	4	Any ten	1	10 X 1 = 10
B	5,6	5			
C	7,8	3			
		To be set short answer type (Ten questions)	To be answered	Marks per question	
A	1,2	3	Any five	2	5x2=10
B	3,4,5	4			
C	6,7,8	3			

Group	**Unit**	**Subjective Questions**			**Total Marks**
		To be set (Ten questions)	To be answered	Marks per question	
A	1,2	3	Any five (Taking at least one from each group)	10	10 X 5 = 50
B	3,4,5	4			
C	6,7,8	3			

Note 1 : Teacher's assessment will be based on performance on given assignments & quizzes.

Note 2 : Assignments may be given on all the topics covered on the syllabus.

Sl. No.	Name of the Author	Title of the Book	Name of the Publisher
1.	A.K. Maini	Colour Television and Video Technology	Wiley
2.	B.R.Gupta,	Consumer Electronics	Sk Kataria & Sons.
3.	Ajay Sharma	Audio and Video systems	Dhanpat Ray & Sons
4.	R.G. Gupta	Audio and Video Systems	Tata McGraw-Hill
5.	Gulati	Monochrome and colour TV	New Age International
6.	Newness	Book View	BPB
7.	Manohar Lotia	Modern CD Player Servicing Manual	BPB Publication
8.	Bartlett	Cable TV Technology and Operation	Tata MCGraw-Hill
9.	R.G. Gupta	Electronic Instruments and Systems	Tata MCGraw-Hill
10.	A.M.Dhake	Television & Video Engineering	Tata McGraw-Hill
11.	Chandrasekhar	Electronics Communication	OXFORD
12.	Bernard Grob	Basic Television and Video System	Tata McGraw-Hill
13.	S. Sharma	Basic Radio and Television	Tata McGraw-Hill
14.	R.R Gulati	Colour Television Principles and Pratice	New age International

E X A M I N A T I O N S C H E M E (SESSIONAL)

Name of Subject: Consumer Electronics Laboratory **Full Marks-50**

Subject Code: EEE/LCONMER/S4

1. Continuous Internal Assessment of 25 marks is to be carried out by the teachers throughout the 4th Semester. **Distribution of marks: Performance of Job – 15, Notebook – 10.**

2.External Assessment of 50 marks shall be held at the end of the 4th Semester on the entire syllabus. One experiment per student from any one of the above is to be performed. Experiment is to be set by lottery system. **Distribution of marks: On spot job – 35, Viva-voce – 15.**

Name of the course: **Digital Electronics**	
Course Code: EEE/DE/S4	Semester: Forth
Duration: One Semester (Teaching-15 weeks + Internal Exam-2 weeks)	Maximum Marks: 100
Teaching Scheme:	Examination Scheme
Theory: 3 contact hrs./ week	Class Test(Internal Examination): 20 Marks
Tutorial:	Teacher's Assessment (Attendance, Assignment & interaction): 10 Marks
Practical: 2 contact hours/ week	End Semester Examination: 70 Marks
Credit: 3 (Theory)+ 1(Practical)	Practical: 50 Marks
Rationale:	
The advancements in microelectronics design, manufacturing, computer technology and information systems have caused the rapid increase in the use of digital circuits. Hence this subject is intended to learn facts, concepts, principles and applications of digital techniques. Thus, students can sharpen their skills of digital design by learning the concept of number systems, logic gates, combinational and sequential logic circuits etc.	
Objectives:	

The student will be able to-

1. Do conversion of number systems
2. Understand the concept of logic gates and its operation
3. Design simple logic circuits using logic gates
4. Design of combinational circuit
5. Design of sequential circuit
6. Gain the comprehensive idea on various memory devices
7. Understand Analog to Digital Conversion and Digital to Analog Conversion techniques
8. Understand different logic families and their comparison

	Content (Name of topic)	Periods	Marks
	Group-A		
Unit 1	**Numbers System & Basic Logic Gates**	5	
	1.1 Number System - Introduction to Binary, Octal, Decimal, Hexadecimal number system, Conversion of number systems, 1.2 1's complement and 2's complement, Binary arithmetic (addition, subtraction, division, multiplication). **1.3** Symbolic representation and truth table for logic gates**:** BUFFER – NOT – OR – AND – NAND – NOR – XOR – X-NOR		
Unit 2	**Boolean Algebra**	5	
	2.1 Boolean variables – Boolean function – Rules and laws of Boolean algebra – De Morgan's theorem 2.2 Max. term and min. term – Canonical form of equation – Simplification of Boolean expression 2.3 Karnaugh map technique – Don't care condition – Prime implicants – Canonical forms – Quine-McClusky method 2.4 Realization of Boolean expression with logic gates		
Unit 3	**Combinational Logic Circuits**	07	
	3.1 ARITHMETIC CIRCUITS**:** Half adder – Full adder – Half subtractor – Full subtractor – Parallel and serial full adder (1's complement, 2's complement and 9's complement addition) 3.2 Design of circuits using universal gates 3.3 Code converter, encoder and decoder – Multiplexer & demultiplexer 3.4 Parity generator and checker – Comparator		
	Group-B		
Unit 4	**Sequential Logic Circuits**	10	
	4.1 Difference between combinational and sequential logic circuits – Triggering of sequential logic circuits 4.2 Difference between flip flop and latch – Construction of RS, D, JK, JK master slave, T flip flops using basic gates, preset and clear signal 4.3 COUNTERS**:** Asynchronous and synchronous counter – Ripple counter – Mod-N counter – Up-down counter – Ring counter – Johnson counter – Programmable counter – Applications 4.4 REGISTERS**:** Shift registers – Serial In Serial Out – Serial In Parallel Out – Parallel In Serial Out – Parallel In Parallel Out – Applications		

Unit 5	**Memory Devices**	5	
	5.1 MEMORY ADDRESSING**:** Read, Write and Read Only operations 5.2 MEMORY CELLS**:** ROM, PROM, EEROM, EPROM, CDROM, Flash Memory 5.3 Circuit diagram using CMOS transistors and working of static and dynamic RAM 5.4 Digital Logic Arrays- PLA, PAL, GAL, FPLA, FPGA		
	Group C		
Unit 6	**Data Converters**	5	
	6.1 DIGITAL TO ANALOG CONVERTERS**:** Binary weighted resistor type – R-2R ladder type – Specifications and applications of DA converter 6.2 ANALOG TO DIGITAL CONVERTER**:** Comparator type – Successive approximation type – Dual slope AD converter – Specifications and applications of AD converter		
Unit 7	**Logic Families**	8	
	7.1 Introduction to digital ICs, 7.2 TTL logic family - Introduction to TTL logic, Realization of basic gates using TTL logic, TTL NAND gate – Totem pole output, open collector 7.3 ECL logic family - Introduction to ECL logic, ECL OR, NOR gate. 7.4 MOS families - Introduction to PMOS, NMOS & CMOS logic, Realization of PMOS inverter, NAND, NOR, Realization of NMOS inverter, NAND, NOR, Realization of CMOS inverter, NAND, NOR. 7.5 Comparative studies of different type of logic families like DTL, TTL, CMOS, and ECL etc. with the following characteristics**:** (a) logic levels, (b) power dissipation, (c) fan in and fan out, (d) propagation delay, and, (e) noise immunity, Basic gates using CMOS. 7.6 Interfacing of ICs of different logic families – Logic hazards 7.7 Study of 7400 TTL series / CD 4000 series gate ICs.		
	TOTAL	45	

Practical:

Skills to be developed:

Intellectual skills:

1. Identification of digital IC's of logic gates. Flip-flops, multiplexer and demultiplexers.
2. Ability to test different digital ICs.
3. Ability to design the combinational and Sequential logic circuits.

Motors skills:

1. Ability to build the circuit.
2. To observe the result and handling the equipments.

1. To verify the truth table of NOT, OR, AND, NAND, NOR, XOR, X-NOR with TTL logic gates and CMOS logic gates.
2. To realize different Boolean expressions with logic gates.
3. To realize half-adder, full-adder, subtractor, parallel and serial full-adder.
4. To design 1's complement, 2's complement and 9's complement adder-subtractor.

5. To implement encoder, decoder, multiplexer and demultiplexer.
6. To construct parity generator and checker & comparator.
7. To verify the function of SR, D, JK and T Flip-flops.
8. To construct binary synchronous and asynchronous counter.
9. To design programmable up / down counter.
10. To design controlled shift register and study their function.
11. To study different memory ICs.
12. To study DA and AD converters.
13. To interface TTL and CMOS ICs.

Mini Projects:

1. Design 1 digit BCD to 7 segment decoder using IC7447.
2. Design 4 bit binary adder/subtractor using IC7483.
3. Design 4 bit synchronous counter using IC7476.
4. Design decade counter using IC7492/93.

EXAMINATION SCHEME (Theoretical)

A) Internal Examination: Marks- 20

B) End Semester Examination: Marks-70

C) **Teacher's Assessment: Marks- 10**

(i) Marks on Attendance: 05

(ii) Assignments & Interaction: 05

Group	**Unit**	**Objective questions Note: 10 multiple choice and 5 short answer type questions**			**Total Marks**
		To be set Multiple Choice (Twelve questions)	To be answered	Marks per question	
A	1,2,3	4	Any ten	1	10 X 1 = 10
B	4,5	4			
C	6,7	4			
		To be set short answer type (Ten questions)	To be answered	Marks per question	
A	1,2,3	4	Any five	2	5x2=10
B	4,5	4			
C	6,7	2			
Group	**UNIT**	**Subjective Questions**			**Total Marks**
		To be set (Ten questions)	To be answered	Marks per question	
A	1,2,3	4	Any five (Taking at least one from each	10	10 X 5 = 50
B	4,5	3			

C	6,7	3	group)		

Note 1 : Teacher's assessment will be based on performance on given assignments & quizzes.

Note 2 : Assignments may be given on all the topics covered on the syllabus.

E X A M I N A T I O N S C H E M E (SESSIONAL)

Name of Subject: Digital Electronics Laboratory **Full Marks - 50**

Subject Code:EEE/LDE/S4

1. **Continuous Internal Assessment of 25 marks** is to be carried out by the teachers throughout the Third Semester. **Distribution of marks: Performance of Job – 15, Notebook – 10.**
2. **External Assessment of 50 marks** shall be held at the end of the Third Semester on the entire syllabus. One Experiment per student from any one of the above is to be performed. Experiment is to be set by lottery system. **Distribution of marks: On spot job – 20, Viva-voce –5.**

	Text Books:		
Sl. No.	**Name of the Author**	**Title of the book**	**Name of the Publisher**
1	G K Kharate	Digital Electronics	OXFORD
2	Anil K. Maini	Digital Electronics	Wiley
3	Jaydeep Chakraborty	Digital Electronics and Logic Design	Universities Press
4	Malvino & Leach	Digital Principles and Applications	Tata McGraw-Hill
5	Anand Kumar	Fundamental Digital Circuits	Prentice Hall of India
6	Jain	Modern Digital Electronics	Tata McGraw-Hill
7	Anokh singh, AK Chhabra	Fundamentals of Digital Electronics & Microprocessors	S.Chand
8	Taub & Schilling	Digital Electronics	Tata McGraw-Hill
9	V. K. Puri	Digital Electronics	Tata McGraw-Hill
10	S. Salivahnan & A. Arivazhgan	Digital Circuits and Design	Vikash Publishing House
11	Morris Mano	Digital Logic and Computer Design	Pearson
12	V. Kumar	Digital Technology	New Age Publishers
13	Subhasis Maitra	Digital Electronics	JBBL
14	DK Chanda & S Banerjee	Digital Fundamentals and Applications	University Science Press
15	Floyd	Digital Fundamentals, 10e	Pearson
16	Dr. SK Mandal	Digital Electronics	Tata McGraw-Hill
17	Tocci	Digital Systems: Principles and Applications, 10e	Pearson

Name of the Course: Power Plant Engineering			
Course Code: EEE /PPE/S4		**Semester: Fourth**	
Duration: one Semester		**Maximum Marks:**	
Teaching Scheme		**Examination Scheme**	
Theory:3 Hrs/Week		Mid Semester Exam.: 20 Marks	
Tutorial:		Assignment & Quiz: 10 Marks	
Practical:		End Semester Exam.: 70 Marks	
Credit: 03			
Aim:			
Sl. No.			
1.	This is a core technology subject. The knowledge of the principle of generation of electricity, methods of generation of electricity & recent trends in generation of electricity is essential for Diploma Engineer.		
2.	This subject will provide the basis for further studies in transmission, distribution and power system operation. Also the subject will provide the knowledge about the recent trends in non conventional energy sources & their working principles.		
Objective:			
Sl. No.	The student will be able to:		
1.	Explain the working of different power plants		
2.	Identify different components of various systems in generating stations		
3.	Select suitable sites for different power stations		
4.	Define the terms used in economics of power generation and explain their relation		
5.	Select alternative energy sources for given conditions		
6.	Explain the working of wind mills and solar systems		
7.	Explain working of domestic & commercial D. G. Set		
8.	Explain working of Gas Turbine		
Pre-Requisite:			
Sl. No.			
1.	Energy conversion		
Contents		Hrs./Unit	Marks
Unit: 1	1.1 **Basics of Power Generation** 1.1 Importance of electrical power in day today life 1.2 Different forms of energy 1.3 Comparison of sources of energy 1.4 Power crisis in India and Future Trend 1.5 Overview of method of electrical power generation	02	4

Unit: 2	**Thermal Power Stations** 2.1 List of thermal power stations in the state with their capacities 2.2 Selection of site for thermal power stations. 2.3 Layout and working of thermal power station with block diagram. 2.4 Operation of following components: 2.4.1 Boiler 2.4.2 Economizer. 2.4.3 Air pre heater 2.4.4 Super-heaters & re-heaters. 2.4.5 Steam prime movers. 2.4.6 Condensers. 2.4.7 Spray ponds & cooling towers. 2.5 Quality of fuel and its effect on quality of power generation. 2.6 Merits and demerits of Thermal Power Plants. 2.7 Simple Problems.	08	15
Unit: 3	**Nuclear Power Stations** 3.1 Selection of site for Nuclear Power plants. 3.2 Nuclear fission process 3.3 Block diagram and working of Nuclear Power station. 3.4 Construction and working of nuclear reactor. 3. 5 Fuels used in Nuclear Power Station 3. 6 Merits and demerits of Nuclear Power Plants 3. 7 List of Nuclear power stations in state & county with their capacities.	06	8
Unit: 4	**Hydro Power Stations** 4.1 Selection of site and classification of Hydro-electric Power Plants 4.2 Layout and working of Hydro Power Station. 4.3 Types of Turbines & generators used 4.4 Pumped storage Power Plant 4.5 Merits and demerits of Hydro Power Station 4.6 List of Hydro Power stations with their capacities & number of units in the state. 4.7 Simple Problem.	06	8
Unit: 5	**Non-Conventional Energy Sources** 5.1 Types of non-conventional energy sources. 5.2 Solar Energy 5.2.1 Potential of solar energy. 5.2.2 Solar collector (Flat Plate Collector & Concentrating Collector) 5.2.3 Comparison of performances of different collectors. 5.2.4 Photovoltaic cell : Principle of operation, Types, conversion efficiency, V-I characteristics. 5.2.5 Solar Cell Materials. 5.2.6 Photovoltaic system of power generation – Solar PV arrays, solar cell connecting arrangements, storage batteries, inverters, advantages & disadvantages. 5.2.7 Limitation of using solar energy systems. 5.3 Wind Energy. 5.3.1 Selection of site for wind mills 5.3.2 Principle of electricity generation with the help of wind energy 5.3.3 Block diagram and working of Wind energy plant and its applications	10	20

	5.3.4 List of major wind farms in the state with their approximate capacities 5.4 Brief idea and application of 5.4.1 Bio Mass and bio gas energy. 5.4.2 Geothermal Energy.		
Unit: 6	**Economics Of Power Generation** 8.1 Terms commonly used in system operation: connected load, firm power, cold reserve, hot reserve, spinning reserve. 8.2 Terms used in system operation such as Load-curve, load duration curve, integrated duration curve. (Simple numerical based on plotting above curves.) 8.3 Factors affecting the cost of Generation: Average demand, Maximum demand, plant capacity factor & plant use factor, Diversity factor& load factor. (Simple numericals based on above)	08	08
Unit: 7	**Interconnected Power Systems** 9.1 Advantages of Interconnection. 9.2 Base load & peak loads, load allocation among various types of power stations 9.3 Load sharing and transfer of load between power stations. 9.4 Inter connection of power stations at state and national level	05	07
	Total	45	70

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
Dr. S. L. Uppal	Electrical Power		Khanna Publishers.
Soni – Gupta - Bhatnagar	A course in Electrical Power		Dhanpatrai & Sons
Prof. G. D. Rai	Non conventional Energy sources		Khanna, New Delhi
Prof. Arrora and Dr. V. M. Domkundwar	A course in Power Plant Engineering		Dhanpatrai & Sons
S P Sukhatme	Solar Energy		Tata Mc Grawhill Publishing co. Ltd.
Godfrey Boyle	Renewable Energy		Oxford University Press
P.K.Nag	Power Plant Engineering		T.M.H.

E X A M I N A T I O N S C H E M E (THEORITICAL)

GROUP	UNIT	ONE OR TWO SENTENCE ANSWER QUESTIONS	SUBJECTIVE QUESTIONS

		TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	***TO BE ANSWERED***	MARKS PER QUESTION	TOTAL MARKS
A	1, 2, 3,4	12	TWENTY	ONE	1 X 20 = 20	FIVE	FIVE, TAKING AT LEAST TWO FROM EACH GROUP	TEN	10 X 5 = 50
B	5,6,7	11				FOUR			

Name of the course: **Analog & Digital Communication**	
Course Code: EEE/ADC/S4	Semester: Fourth
Duration: One Semester (Teaching - 15 weeks + Internal Exam-2 weeks)	Maximum Marks: 100 Marks
Teaching Scheme:	**Examination Scheme**
Theory: 3 contact hrs./ week	Class Test (Internal Examination): 20 Marks
Tutorial:	Teacher's Assessment (Attendance, Assignment & interaction): 10 Marks
Practical: 2 contact hours/ week	End Semester Examination: 70 Marks
Credit: 4 (Five)	Practical: 50 Marks
Rationale:	

Communication plays vital role in our lives. Development in communication technology have increased its applications in allied fields of electronics including satellite, mobile, RADAR, telephony, telegraphy, industrial controls, etc. This course concentrates on the field of analog communication and pulse modulation including delta modulation. It also includes the advantages and disadvantages of digital and analog communications. After passing through the course the students will also be acquainted with the basic telephony and telecommunication switching.

Objectives:

The student will be able to:

- Classify different types of communication system.
- Explain electromagnetic spectrum.
- Know the basic requirements of an analog communication system;
- Understand analog modulation including PAM, PWM, PPM and Delta Modulation;
- Know the functioning of transmitter and receiver;
- Explain the difference between digital and analog communication;
- Discuss the ideas dealing with the operation of the systems like telephony.

	Content (Name of topic)	**Periods**	**Marks**
	Group-A		
Unit 1	**Introduction To Electronic Communication**	5	

	1.1 Importance of communication, Elements of a communication system **1.2** Types of electronic communication –Simplex, Half Duplex and Full Duplex , Electromagnetic spectrum (different bands and their frequencies , Bandwidth-concept of transmission bandwidth **1.3** Basic idea of Fourier series and Fourier transform.		
Unit 2	**Analog Modulation**	9	
	2.1 Concept and necessity of modulation 2.2 Definition of amplitude, frequency and phase modulation 2.3 Derivation of sidebands in AM systems – Evaluation of power – Sideband depth –Efficiency of modulation, Percentage of modulation, Representation of AM signal in time and frequency domain. 2.4 METHODS OF AM**:** Principles of operation of plate modulated Class C amplifier – Balanced modulator, Ring modulator 2.5 Expression of sidebands in FM and PM systems and its interpretation – Modulation index and bandwidth requirement, Representation of FM signal in time and frequency domain. 2.6 Principles of operation of frequency modulation using Varactor diode and VCO. 2.7 Comparison of AM, FM and PM 2.8 Pulse modulation: Introduction, comparison with Continuous Wave Modulation, advantages, Sampling theorem, Nyquist rate, aliasing, natural & flat top sampling 2.9 Concept of Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM) – Principle of generation and reception of PAM, PWM & PPM with block diagram and their applications		
	Group-B		
Unit 3	**Transmitting Systems**	3	
	3.1 Block diagram and function of different stages of AM and FM broadcast transmitter 3.2 WORKING PRINCIPLES OF SSB SYSTEMS WITH BLOCK DIAGRAM**:** Filter Method – Phase Shift Method		
Unit 4	**Demodulation**	4	
	4.1 Principle of detection with diode detector 4.2 AGC circuit delayed AGC 4.3 Foster-Seeley discriminator – Ratio Detector – Limiter – Standard AFC Circuits (basic principles only, no derivation) 4.4 PLL (block diagram & operation) explanation.		
Unit 5	**Receiving System**	6	
	5.1 Principle of heterodyne, Characteristics of AM radio receiver- Sensitivity, Selectivity, and Fidelity 5.2 Block diagram and principle of operation of super heterodyne receiver – IF amplifier and choice of IF – Mixer and converter – Alignment and tracking –		

	Tone and volume control – Band spreading – Receiver characteristics & Testing – sensitivity, selectivity and fidelity 5.3 Block diagram and principle operation of FM receiver – Pre-emphasis and de-emphasis – AFC and alignment of FM receiver		
	Group-C		
Unit 6	**Basic Telephony**	10	
	6.1 Telephone transmitter – Receiver – Dial tone, side tone and antisidetone circuits – Handset – Ringer – Switch hook – Hybrid – Local loop – Tone dialling – DTMF 6.2 Electronic Exchange: Space division switching, time division switching, block diagram of electronic exchange , 6.3 Discuss the numbering plan of telephone networks (National Schemes & International Numbering) **6.4** Describe the operation of EPABX.		
Unit 7	**Pulse Code Modulation**	4	
	7.1 Idea of digital communication – Advantages of digital communication over analog communication 7.2 BASIC STEPS IN PCM SYSTEM**:** Filtering – Sampling – Quantizing – Encoding – Line coding (HDB3, AM1, CM1, NRZ, RZ) 7.3 Block schematic description of transmitter and receiver of PCM system 7.4 Principles of linear and non-linear quantization – Companding, Inter Symbol Interference		
Unit 8	**DELTA MODULATION**	3	
	8.1 Block schematic description of delta modulation technique 8.2 Limitations of delta modulation – Slope overload and granular noise. 8.3 Concept of adaptive delta modulation technique		
	TOTAL	45	

Contents Practical

Skills to be developed: On satisfactory completion of the course, the students should be in a position to design few fundamental networks.

Intellectual Skills:

1. Selection of appropriate sample
2. Selection of Equipment
3. Interpretation of waveforms

Motor Skill:

4. Accurate observation
5. Setting up of Equipment
6. Measurement

List of Practical: Any EIGHT(including MINI PROJECT)

Suggested List of Laboratory Experiments

Sl. No.	

1.	To study the amplitude modulation and demodulation technique.
2.	To study the frequency modulation and demodulation technique.
3.	To study the frequency spectrum of AM and FM with the help of spectrum analyzer.
4.	To study the analog signal sampling and reconstruction of the effect of**: —** (a) different sampling frequencies on reconstructed signals; (b) Varying duty cycle of sampling frequency on the amplitude of reconstructed signal.
5.	Observe waveforms of Pulse code modulation and demodulation.
6.	Observe waveforms of Delta modulation.
7.	Observe waveforms of Adaptive delta Modulation
8.	To study some radio receiver measurements**:** (a) sensitivity, (b) selectivity and (c) fidelity.
9.	Observe input & output waveforms of AM detector.
10.	To study EPABX**:** (a) to study the electrical behaviour of different tones – dial tone, ringing tone, ring back tone and busy tone (both subscriber and exchange); (b) to study some extension features-redial, burgling, extension privacy, call forwarding, follow me etc.
List of MINI PROJECTS	
1.	AM/FM Radio Receiver/Transmitter using transistor
2.	AM modulator/detector/mixer using diode.
3.	FM detector.

Examination scheme (Theoretical):

A. Internal Examination: Marks- 20

B. End Semester Examination: Marks-70

C. Teacher's Assessment: Marks- 10 i) Marks on Attendance: Marks-05

ii) Assignments & Interaction: Marks- 05

Group	**Unit**	**Objective questions** **Note: 10 multiple choice and 5 short answer type questions**			**Total Marks**
		To be set Multiple Choice (Twelve questions)	To be answered	Marks per question	
A	1,2	4	Any ten	1	10 X 1 = 10
B	3,4,5	4			
C	6,7,8	4			
		To be set short answer type (Ten questions)	To be answered	Marks per question	
A	1,2	3	Any five	2	5x2=10
B	3,4,5	3			
C	6,7,8	4			
Group	**Unit**	**Subjective Questions**			**Total Marks**
		To be set (Ten questions)	To be answered	Marks per question	

A	1,2	3	Any five (Taking at least one from each group)	10	10 X 5 = 50
B	3,4,5	3			
C	6,7,8	4			

Note 1 : Teacher's assessment will be based on performance on given assignments & quizzes.

Note 2 : Assignments may be given on all the topics covered on the syllabus.

Sl. No.	Name of the Author	Title of the Book	Name of the Publisher
15.	Chandrasekhar	Communication system	OXFORD
16.	**Ganesh Babu**	Communication Theory	SCITECH
17.	Wayne Tomasi	Electronic communication system	Pearsons Eduction
18.	Singh & Sapre	Communication Systems	Tata McGraw Hill
19.	B.P. Lathi	Analog and Digital communication	OXFORD
20.	Sanjay Sharma	Analog and digital Communication	S.K. Kataria
21.	Simon Heykin	Communication system	Wiley
22.	John C Bellamy	Digital telephony	Wiley India
23.	Anokh Singh and Chabaria	Principles of Communication Engg	S Chand
24.	Couch	Digital & Analog Communication System	Pearson
25.	Kennedy	Electronic Communication System	Tata MCGraw-Hill
26.	Taub & schilling	Analog and digital communication	Tata MCGraw-Hill
27.	Frenzel	Communication Electronics	Tata McGraw-Hill
28.	K. Sam. & Shanmugar	Digital & Analog Communication	Wiley

E X A M I N A T I O N S C H E M E (SESSIONAL)

Name of Subject: Analog & Digital Communication Laboratory Full Marks-50

Subject Code: EEE/LADC/S4

1. Continuous Internal Assessment of 25 marks is to be carried out by the teachers throughout the 4th Semester. **Distribution of marks: Performance of Job – 15, Notebook – 10.**

2. External Assessment of 25 marks shall be held at the end of the 4th Semester on the entire syllabus. One experiment per student from any one of the above is to be performed. Experiment is to be set by lottery system. **Distribution of marks: On spot job – 20, Viva-voce – 5.**

Group	Unit	Objective questions Note: 10 multiple choice and 5 short answer type questions			Total Marks
		To be set Multiple Choice (Twelve questions)	To be answered	Marks per question	
A	1,2,3	4	Any ten	1	10 X 1 = 10
B	4,5	4			
C	6,7	4			
		To be set short answer type (Ten questions)	To be answered	Marks per question	

A	1,2,3	3	Any five	2	5x2=10
B	4,5	3			
C	6,7	4			
Group	**Unit**	**Subjective Questions**			**Total Marks**
		To be set (Ten questions)	To be answered	Marks per question	
A	1,2,3	3	Any five (Taking at least one from each group)	10	10 X 5 = 50
B	4,5	3			
C	6,7	4			

Name of the Course: Development of Life Skills-II	
Course Code: EEE /DLSII/S4	**Semester: FOURTH**
Duration: one Semester	**Maximum Marks: 50**
Teaching Scheme	**Examination Scheme**
Theory: 01 hrs / week	Internal Sessional: 25
Tutorial:	External Sessional : 25
Practical: 02 hrs / week	
Credit:	

Aim:

Sl. No.	
1.	In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. As such the individual skills are not sufficient to work at his best.
2.	This subject will develop the student as an effective member of the team. It will develop the abilities and skills to perform at highest degree of quality as an individual as well as a member of core group or team.
3.	Such skills will enhance his capabilities in the field of searching, assimilating information , managing the given task, handling people effectively ,solving challenging problems .

Objective:

Sl. No.	**The students will be able to:**
1.	• Developing working in teams.
2.	• Apply problem solving skills for a given situation.
3.	• Use effective presentation techniques.
4.	• Apply techniques of effective time management.
5.	• Apply task management techniques for given projects.
6.	• Enhance leadership traits.
7.	• Resolve conflict by appropriate method.
8.	• Survive self in today's competitive world.
9.	• Face interview without fear.

10.	• Follow moral and ethics.		
Pre-Requisite:			
Sl. No.			
1.	Team Work and Presentation Skills		
2.	Positive attitude and thirst of learning		
	Contents	Hrs./Unit	Marks
Unit - 1	**Interpersonal Relation** Importance, Interpersonal conflicts, Resolution of conflicts, Developing effective interpersonal skills - communication and conversational skills, Human Relation Skills (People Skills)	5	
Unit - 2	**Problem Solving** **I) Steps in Problem Solving (Who? What? Where? When? Why? How? How much?)** 1. Identify, understand and clarify the problem 2. Information gathering related to problem 3. Evaluate the evidence 4. Consider feasible options and their implications 5. Choose and implement the best alternative 6. Review **II) Problem Solving Technique** 1. Trial and Error, 2. Brain Storming 3. Thinking outside the Box	8	
Unit - 3	**Presentation Skills** Concept, Purpose of effective presentations, ***Components of Effective Presentations*** : understanding the topic, selecting the right information, organising the process interestingly, Good attractive beginning, Summarising and concluding, adding impact to the ending, ***Use of audio visual aids*** - OHP, LCD projector, White board, ***Non-verbal communication*** : Posture, Gestures, Eye-contact and facial expression, Voice and Language - Volume, pitch, Inflection, Speed, Pause, Pronunciation, Articulation, Language Handling questions - Respond, Answer, Check, Encourage, Return to presentation ***Evaluating the presentation*** - Before the presentation, During the presentation, After the presentation	8	
Unit - 4	**Looking for a Job**	5	

	Identifying different sources announcing Job vacancies, Skim, scan and read advertisements in detail, write efficacious CVs, write covering letters to accompany CVs, write Job Application Letters - in response to advertisements and self-applications		
Unit - 5	**Job Interviews** ***Prepare for Interviews*** : Intelligently anticipating possible questions and framing appropriate answers, Do's and don'ts of an interview (both verbal and non-verbal), ***Group Discussion:*** Use of Non□verbal behaviour in Group Discussion, Appropriate use of language in group interaction, Do's and don'ts for a successful Group Discussion	10	
Unit - 6	**Non-verbal - graphic communication** Non - verbal codes: A - Kinesics, B - Proxemics, C- Haptics, D - Vocalics, E- Physical appearance, F- Chronemics, G - Artifacts Aspects of Body Language	6	
Unit - 7	**Formal Written Skills:** Memos, E-mails, Netiquettes. Business correspondence - Letter of enquiry, Letter of Placing Orders, Letter of Complaint	6	
Total		**48**	

Sessional Activities	
Sl. No.	Skills to be developed
Unit -1 Interpersonal Relation	Case Studies: 1. from books 2. from real life situations 3. from students' experiences Group discussions on the above and step by step write of any one or more of these in the sessional copies
Unit - II Problem Solving	Case Studies: 1. from books 2. from real life situations 3. from students' experiences Group discussions on the above and step by step write of any one or more of these in the sessional copies
Unit - III Presentation Skills	Prepare a Presentation (with the help of a Powerpoint) on a Particular topic. The students may refer to the Sessional activity (sl. No. 8) of the Computer Fundamental syllabus of Semester 1. For engineering subject-oriented technical topics the co-operation of a subject teacher may be sought. Attach handout of PPT in the sessional copy
Unit- IV	Write an effective CV and covering letter for it.

Looking for a job	Write a Job Application letter in reponse to an advertisement and a Self Application Letter for a job.
Unit - V Job Interviews & Group Discussions	Write down the anticipated possible questions for personal interview (HR) along with their appropriate responses Face mock interviews. The co-operation of HR personnels of industries may be sought if possible Videos of Mock Group Discussions and Interviews may be shown
Unit - 7 Formal Written Skills	write a memo, write an effective official e-mail, write a letter of enquiry, letter of placing orders, letter of complaint

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
K. R.Laksminarayanan & T. Murugaval	Managing Soft Skills		Scitech Publications (India) Pvt. Ltd.
Barun K. Mitra	Personality Development and Soft Skills		Oxford University Press

Name of the Subject : Professional Practices II			
Course Code: EEE/ PFII /S4		**Semester: Fourth**	
Duration: one Semester		**Maximum Marks: 50**	
Teaching Scheme		**Examination Scheme**	
Theory:		Mid Semester Exam.:	Marks
Tutorial:		Assignment & Quiz:	Marks
Practical: 2 hrs / week		End Semester Exam.:	Marks
		Practical :	50 Marks
Credit: 1			
Aim:			
Sl. No.			
1.	Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.		
2.	While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.		
3	The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.		
Objective:			
Sl. No.	The student will be able to		

1.	Acquire information from different sources
2.	Prepare notes for given topic
3.	Present given topic in a seminar
4	Interact with peers to share thoughts
5	Prepare a report on industrial visit, expert lecture
Pre-Requisite:	
Sl. No.	
1.	Desire to gain comparable knowledge and skills of various activities in various areas of import ance.
2.	Eagerness to cohesively participate in group work and to share thoughts with group members .
3.	Knowledge of electrical engineering upto 4th semester.

Activities

Sr. No.	Activities	Hours	Marks
1.	Industrial / Field Visit : Structured Field visits be arranged and report of the same should be submitted by the individual student, to form part of the term work. Visits to **any ONE** (not already visited in 3rd semester) from the list below: i) Electrical machine manufacturing industry ii) Multistoried building for power distribution iii) Load dispatch center iv) Transformer repair workshop. v) Foundry (to see furnaces and oven) vi) Food Processing industry (overall technical and other activities) vii) An industry automation in manufacturing viii) District Industries Centre (to know administrative set up, activities , various schemes etc) ix) Any loco shed x)Signaling system of a railway station xi) Any captive power plant. xii) Motor rewinding in a motor rewinding shop	**06**	
2.	**Guest Lecture by professional / industrial expert**: Lectures by Professional / Industrial Expert to be organized from **any TWO of** the following areas: i) Modern concept of lighting / illumination ii) Viability of electric traction in 21st Century	**4**	

	iii) Modern techniques in Power Generation iv) Role of power factor improvement as a tool in reducing cost of g eneration v) Digital metering vi) Hydro power generation vii) Functioning of Electricity regulatory Commission. viii)Introduction and application areas for MEMS (Micro Electromechani cal System) ix) Interview techniques x)Free and open source software xi) Cyber crime & Cyber laws xii)Social networking – effects & utilities xiii) Ethical Hacking. xiv) Role of micro, small and mediun enterprise. In Indian economy. Individual report of the above lecture should be submitted by the stu dents.		
3.	**Seminar:** Any one seminar on the topics suggested below: Students (Group of 4 to 5 students) have to search / collect informat ion about the topic through literature survey/ internet search / visit and discussion with expert or concerned persons 1. Water Supply scheme / Problems of drinking water in rural area 2. Schemes of power generation in coming five years 3. Impact of load shedding on rural population 4. Parallel computing 5. Distributed processing 6. Embedded system 7. Computer security 8. Bio – technology 9. Multimedia techniques. 10. Magnetic levitation system	**12**	
4.	**Students' Activities / mini project:(any one)** i) Collect information from market regarding technical specification, id entification no, their meaning, manufacturers' names and cost of elec tronic devices like diode, zener diode, transistors, JFET, MOSFET, ic 5 55, ic 741, digital ics (All items studied upto 4th semester). Submit the report along with power point presentation. Students are encour aged to use **open software**	**10**	

	ii) Collect information from market regarding specification and cost of items (at least four each) used in electrical wiring for Domestic, co mmercial and industrial use. They will submit individual report on th e same. Students are encouraged to use open software. iii) make a market survey of all transducers available (studied in fou rth semester) their specifications, manufacturers' names, cost etc. Pre pare a power point presentation. Students are encouraged to use **op en software** for such purpose.		

EXAMINATION SCHEME (SESSIONAL)

Continuous internal assessment of 50 marks is to be carried out by the teachers throughout the fourth semester. **Distribution of marks: Student's activities/mini Project = 20, seminar = 10, field visit = 10, guest lecture attendance and report = 10**